



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

I have now only to speak of the waste that comes from the battüe, and the husks of the cocons, that have still some silk upon them, which are thrown into baskets in winding, and are what we call *morelques*. These you first dry in the sun, then thresh, and afterwards card and spin them to make fleuret. One hundred and fifty ounces of good cocons yield about eleven ounces of silk from five to six cocons; if you wind coarser, something more. You may wind about eleven or twelve ounces of silk from five to six cocons in fourteen hours.

The silk which is made of bassinats and bad choquette serves to make stockings and coarse heavy stuffs, such as sattinades and damasks for hangings, &c. &c.

N° XLII.

The Art of making Anatomical Preparations by Corrosion.
By JOHN MORGAN, M. D. Professor of the Theory and Practice of Physic in the University of Pennsylvania, Member of the Royal College of Physicians at Edinburgh, and F. R. S. at London, &c.

AS no branch of science more certainly leads to an intimate acquaintance with the functions of the animal body, (which is the foundation of all rational knowledge of the causes and cure of diseases) than that of the structure of the vascular system, the origin, divisions, different ramifications and numerous anastomoses of the vessels into, and their communication with each other, I have always thought this field of useful information deserved to be cultivated with great industry and attention. In effect it brings us immediately, and in the most compendious way, to acquire a knowledge of the nature, and of the motions of the fluids which circulate through them, of their distribution throughout the different parts of the body,

body, and of the action and uses of the vessels containing, as well as of the humours contained in them. In particular, it behoves every practitioner of physic to study the vascular texture and composition of the viscera, for upon their healthful action the continuance of life, free from disease, principally depends; and the more their functions are injured, the more dangerous diseases are thereby generated. From a relaxation of them arise atonia and weakness, and from obstruction of them infarctions, inflammations, tumors and schirri are produced. To an acquaintance with their structure and anastomoses, and the fluids they carry, we must be chiefly indebted for our knowledge of the doctrines of resolution and suppuration, and for the indications that point out to the physician by what means to accomplish these desirable events, according to circumstances.

The little progress which practical anatomy has hitherto made in America, and the great consequence it may be of to the rising students of physic and surgery, to employ more of their attention on this useful subject, are my motives for laying before you this essay, in hopes through this channel to stir them up to prosecute it with more zeal and ardor. This becomes the more necessary, because, owing to the late revolution, the subjects of North-America having established themselves into independent states, have at present less commerce and less intercourse with the learned and polished nations of Europe. At least fewer students from America have recourse to them for improvement in the knowledge of their profession than formerly, in as much as medical schools and colleges have been founded in several of these different states, since the author of this essay first recommended and assisted in carrying into execution the plan of transplanting physic, as a science, from across the ocean, by instituting medical schools on this western side of the Atlantic*.

A a a 2

Upon

* See his discourse on the institution of medical schools in America, delivered at a public commencement in the college of Philadelphia, May 1765.

Upon our own exertions must we therefore chiefly depend for building up the medical fabric, erecting useful temples of the healing arts, and diffusing the lights we can kindle through this new world. I know no one step that can be more useful to accomplish this undertaking, than to teach the art of investigating the structure of the different parts of the animal body, by injections and corrosions, and other preparations of wax.

Such is the present state of anatomy in this country that there are at present but very few, I believe I may say no such preparations worth mentioning to be met with here, that have been made in America. Doctor Chovet, now resident in this city has indeed a good collection of wax preparations, of different parts of the human body, which he made in his younger days and brought hither from Europe. But nothing of this kind has hitherto been practised, or it has been so taught as never to have been of lasting use to any that I know of.

Being well acquainted with the general desire that fills the breasts of my countrymen, to acquire and improve every kind of science that is useful, which is properly laid before them, I trust this attempt will stir up many to learn and practise those lessons which, for their particular benefit, I now unfold to them; nor do I doubt in a little time but we shall see such an emulation kindled for improving on these hints, that all kinds of useful preparations will be so common after a while, as not only to give rise to anatomical cabinets and repositories for specimens of the animal, vegetable and fossil kingdoms, as will tend to throw great light upon philosophy in general, but contribute to lay a solid and useful foundation of natural history in America.

The first rudiments of this art that I acquired was from the two Hunters, known through all Europe for their superior skill in anatomy, and acting as practical dissector to the celebrated doctors Colignon and Smith, professors of anatomy in the universities of Cambridge and Oxford,

ford, which I further improved by practice at Paris with Monf. Süe, to whom I am wholly indebted for my knowledge of anatomical preparations in wax.

The kind of preparations of those parts of the animal body which admit of it that I now propose to explain, namely by injection and corrosion, exceeds in beauty, nicety and usefulness, that which is commonly called dissection.

In fact, in this latter, we can trace nature but very imperfectly, because by dissection, the larger vessels only are preserved from the knife, and for the most part all the smaller are unavoidably cut away.

On the contrary, in anatomical preparations by corrosion, even the very small vessels may be kept entire, and we can see, at a cast of the eye, the course and distribution of all the vascular system even to the size of an hair, called capillary vessels, and those too disengaged from the surrounding parts, which otherwise wholly conceal, or make them difficult to be perceived. It is impossible that with only the assistance of a dissecting knife, any person should be able to lay open to view all those smaller vessels, however skilful and experienced the hand may be that directs it. The exact and perfect imitation of nature which this sort of preparations presents, the ease with which they are made, and their extraordinary beauty and neatness, render a knowledge of this art so much the more desirable.

The art of injecting the very fine vessels of the body with common injection, was well known to the celebrated Ruysch, the most famous anatomist, in that way, of any living in Europe in his day; and therefore it has been sometimes called the Ruyschian art, but it fell short of the one I now undertake to explain, because in his preparations the minute vessels only become visible, so far as the substance through which they proceed was transparent, but our art extends to the removal of every surrounding

rounding substance, and leaves them entirely naked and perfectly exposed to the eye. I once shewed a preparation of the vessels of a kidney I had thus executed at Paris, to a meeting of the French academy of surgery in the year 1764, who allowed it to be curious and quite new to them. I think none of the members present at that meeting, except *Monf. Morand*, secretary of that academy, who had been in England and was acquainted with doctor *Hunter*, alledged their having ever seen a similar preparation. At their request I presented a memoir on the subject, and since that time *Monf. Süe* has bestowed one entire section in treating expressly upon it, with a polite acknowledgement of his having acquired his knowledge from me, only with the particularity of naming me as one of the faculty of Edinburgh, without taking any notice of my being a Pennsylvanian by birth, or native of America, which have led some into mistakes concerning the author of that piece. The reason may be that Americans before the revolution, being but little considered in any other light than as colonists, their nation was seldom taken notice of, and I was introduced to him first as a graduate of the university of Edinburgh, and known to him afterwards as a member of the royal college of physicians of that place.

These preparations are, since that period, become common in France, and the art is now well known, and cultivated successfully by *Monf. Süe* and others; but it was unknown there till I communicated it, first at Paris, and afterward in the south of France; where I had the honour of explaining it to the illustrious *Monf. Imbert*, chancellor of the university at Montpellier, and to *Monf. Bourgelas*, principal of the *Ecole veterinaire*, or academy established at Lyons for the improvement of the science of horsemanship, justly celebrated for his very elegant preparations of the anatomy of horses, &c. But what gave me equal pleasure and surprize, was the admiration excited on my presenting

presenting only a part of the vascular preparation of a kidney by corrosion, (the rest being broke down in a journey by land of above a thousand miles) which was expressed by the celebrated Morgagni, illustrious professor of anatomy in the university of Padua. He had kept up a literary correspondence with Ruysch when alive, had been favoured with specimens of this great man's preparations, and declared that in comparison to the preparation I gave him, they were "*rudis indigestaque moles.*" From this small specimen, he said, "*ex ungue leonem,*" he could readily comprehend that the usefulness of this kind of knowledge amongst the learned in anatomy, must become great and extensive.

I mention these anecdotes merely to show how recent, or at least how confined the knowledge of this useful art then was, being limited, as far as I know, to Great-Britain only. I suppose it to be owing to this circumstance, viz. that real practical anatomists who have excelled in their preparations, have too generally kept secret the methods and arts they employed in making those preparations. For this reason, much I think is due to the memory of the great Professor Monro, of Edinburgh, who has published a paper upon the art of making injections.

So far as I can learn, this art cannot be traced farther back than to the learned Dr. Nichols of London, who formerly gave lectures in anatomy both there and at Oxford, and from whom Dr. Hunter acknowledged to his pupils that he received his first information. He then deserves to be looked upon as the author and inventor of this art. When Dr. Nichols declined the business, Dr. Hunter and his brother Mr. Hunter, took up the profession of anatomy. Without doubt, those unrivalled brothers in anatomical skill, made considerable improvements in the art of injecting and dissecting animal bodies; and it is likely improved the composition of injections for corrosion.

My

My well meant intention of marking the rise and progress of this art, and of exciting an emulation in my countrymen to prosecute and improve it, will, I hope, not only excuse but justify both the matter and length of my introduction.

These preliminaries being thus settled, I now proceed to the main object of this communication. Without expatiating upon the advantages that will attend an accurate knowledge of this art, for the sake of perspicuity I shall here restrict myself to laying the following observations before you, reduced to general heads, in as few words, and in as concise a manner as I am able. They may be useful to those who wish to put them in practice, and will perhaps give occasion to persons who are curious in making experiments in anatomy, to light up some new discovery.

The art of making anatomical preparations by corrosion, depends on the following principles.

1. We ought for the matter of injection to make use of a substance that is possessed of a suitable degree of consistence, and fine enough to penetrate into the minutest vessels, and which at the same time has such a firmness of texture as not to alter with the changes of the temperature of the atmosphere, that is, it ought not to be subject to melt with the summer's heat, nor to break down from its brittleness on being gently handled in the winter.

2. The colours to be employed for sake of distinguishing the different orders of vessels, whether arterial, venal, tracheal or others, ought to be of such a nature as not to be changed upon application of the menstruum.

3. We ought to make use of a menstruum that is capable of consuming the muscular, parenchymatous, cellular or fatty parts that surround the vessels, without affecting the substance that we use for injection to fill the vessels.

4. Care and address are necessary in the person who makes the injection.

5. Lastly, great attention is requisite in removing the loose and corroded parts, and in separating them from the injected

injected vessels without breaking them down by the force applied in cleansing them.

The following directions will serve to guide the operator in these different manœuvres.

The common injections are composed of wax and fuet, or of wax and oil; the fuet or oil is made use of to soften the wax, and to give it the necessary consistence. We cannot employ such a composition in our corroded preparations, being opposed to the third principle laid down; because the menstruum we use for destroying the parts that surround the vessels, will also attack and consume the fat and animal substances which enter into the composition of the injection. But we may employ the following compositions, the goodness whereof has been proved by repeated trials, viz.

FIRST RECEIPT.

Take of white or the best yellow wax and purified rosin each equal parts, e. g. ten or twelve ounces; melt them together and add a sufficient quantity of spirit of turpentine, to give a due consistence, that is from six to eight ounces.

It is adviseable to melt the rosin first, and strain it through a piece of fine linen; because, in the state it is bought out of the shops, it is often mixed with foreign substances.

I am of opinion this injection will turn out to be finer than the following, that is, it will penetrate into still smaller vessels, but it is thought to have the inconvenience of being more brittle; so that after corrosion, the most slender of the vessels are more liable to break down in handling the preparation.

The following is the receipt which the celebrated Messrs Hunter of London, have commonly made use of. It is less brittle and produces a firmer cohesion of parts, with nearly the same consistence as the former. Besides, it enters very sufficiently into the capillary vessels.

SECOND RECEIPT.

Take of pure rosin eight ounces, of wax four ounces, of Venice turpentine a sufficient quantity, that is, about

B b b

eleven

eleven or twelve ounces, to procure a proper consistence to the injection.

The method of ascertaining the due consistence and the necessary firmness of the injection, is by taking up any quantity of it, whilst melted, with a small wooden spatula, and then letting it fall drop by drop on the surface of cold water. This immediately spreads and forms into a thin plate. By rolling it between your thumb and finger first moistened, or in the palm of one hand with the fingers of the other, both previously made wet to prevent sticking, turn it into the shape of a cylinder or small blood-vessel, then throw it into a basin of cold water, and let it remain till it is quite cold. If it is then of such a consistence as not to yield to a very slight force, when pressed between your thumb and finger, and yet so soft as to be capable of bending readily without breaking, it has the due medium of firmness and flexibility which is desired. If it appears to be too soft, a further quantity of wax and rosin are to be added in the above mentioned proportion, till it acquires the wished for consistence. If, on the other hand, it is too hard, a proportionably larger quantity of the Venice turpentine is to be added. The same precaution is to be observed, if we make use of rosin, wax and spirit of turpentine, as directed in the first receipt.

Operators seldom are at the trouble of weighing the ingredients; they generally judge of the respective weights and proportions of each by the eye. This method of determining them will answer very well for persons who have acquired experience; for the different season of the year when the injection is made, and the different consistence or purity of the wax and rosin, with other little circumstances which sometimes happen, occasion some little variation. In general there is not so great danger of spoiling the preparation, by making the composition a little softer than is required, rather than harder, because it grows some what harder by time, and also by steeping the

the parts injected in water, for the sake of washing off the menstruum that we have made use of for performing the necessary corrosion.

These injections are well suited to make corroded preparations of the viscera, as of the heart, lungs, liver and kidneys. Yet I doubt not but persons of ingenuity, who shall be at the pains to render themselves conversant in the art of injection, by giving attention to every circumstance, will acquire further skill and may find other substances, equally fit for injection without being so liable to become brittle, which those compositions I have given above are, in some degree, even when made with the utmost care and exactness.

To know whether any substance of which a person wishes to make a trial for injection, will withstand the action of the menstruum he means to employ, it is sufficient to put a piece of the composition to be used as an injection into a small quantity of the menstruum, and let it remain in it for a week or fortnight; by that means he can judge of its goodness, before he is at the trouble of making, or of spoiling an injection, as the case may happen.

Of the COLOURS.

The colours we commonly use to distinguish the different orders of vessels are, 1st. Vermilion for colouring the injection for the arteries. 2d. Blue verditure, or what is called Prussian blue, for the injection to be thrown into the veins. 3d. For colouring the injections to be thrown into the ureters and pelvis of the kidneys, and the tracheal vessels of the lungs, what are called in English king's yellow and flake white are mostly used. A variety of other colours may be employed, but these are the principal and the best.

We should observe to melt the wax thoroughly over a slow fire, and the colouring powders should be added by degrees, stirring them well in at the same time, before the

other ingredients are added. This method prevents any effervescence, which often happens when there is too great a fire, or when all the ingredients are mingled together before the colouring powders are added, especially the two last. The quantity is judged of by trial.

Of the proper MENSTRUUM.

I now pass to the third head, viz. to consider what substances will answer, for consuming all the parts surrounding the injection, and leaving the matter in the vessels themselves untouched.

The best I have yet tried is the concentrated fuming acid of marine salt, which comes over in the distillation employed in the process for making glaubers salt; it should not be diluted with water, nor be dulcified, otherwise it becomes too weak to answer the purpose, or at least the time required for completing the corrosion is thereby protracted beyond what is needful.

The concentrated acids of vitriol and of nitre, are no less powerful to destroy all the animal substance, surrounding the injected vessels, but the objection to which, from several trials, they appear to be liable, is that they are supposed to crisp the vessels; at least the spirit of sea-salt has been most used, and concluded to be the least exceptionable menstruum for this operation.

Such were the sentiments I communicated, in my memoir to the royal academy of surgery at Paris in the year 1764, since which, Monsr. Süe, royal professor of anatomy in the schools of surgery, and in the royal academy of painting and sculpture at Paris, having honoured my communication to the abovementioned academy, with a section in his treatise entitled *Anthropotomie*, chap. 2. sect. 25. from page 70 to page 84; after acknowledging that he received the art of making those preparations from me, thus adds. "Since that time my nephew and I, having worked at them a great deal, and with abundant success.

cefs, we have discovered, that we may change the menftruum, without injuring the preparation at all, and employ aqua fortis, or the nitrous acid in place of the fuming fpirit of falt; and that aqua fortis is even a more perfect menftrum, than the fpirit of falt, in as much as the colour of the injection is thereby lefs changed, and the fmall veffels better preferved. Befides the difference of expence is confiderable, as the fpirit of falt is worth eighteen livres a pint, whilft the aqua fortis cofts at moft but two livres, and the effect is the fame for quantity. I have alfo employed the fpirit of nitre for the fame purpofe, with great fuccefs*.”

In refpect to the fourth Principle, namely, the Address of the Operator, and wherein it confifts.

He ought to guard againft cutting away or removing the cellular and other furrounding parts, before he has made the injection. In fact, thefe give firmnefs to the veffels, and prevent their ftretching unnaturally, or affuming forms contrary to nature, from the impulfe of the injection when drove into them by the hand of the anatomift. Thefe fubftances enable them to refift the too great extenfion and yielding to the force applied.

The injecting pipes ought to be proportioned to the fize of the veffels through which the injection is to be made.

It is proper to foak thofe parts in warm water, which we are about to inject, for a fhorter or longer fpace of time, as well to wafh them clean, as to carry off the blood and other fluids, and the better to difpofe thofe parts to receive the injection, with which they are to be filled.

The

* Monf. Morgan, Docteur en medecine de la faculté d'Edinbourg, en a donné une defcription exaéte à l'Academie royale de la chirurgie, et c'eft de lui que je tiens l'art de préparer ces parties; mais depuis après y avoir beaucoup travaillé, mon neveu et moi, et y avoir eu beaucoup de fuccès, nous avons decouvert qu'on pouvoit changer le menftruum, fans préjudicier en rien à la preparation, et employer, au lieu de fel fuming, l'eau forte, qui eft même un menftruum plus parfait, que l'efprit de fel, puiſque la couleur de l'injection eft moins changée, et que les petits vaiſſeaux font mieux confervés. D'ailleurs la différence eft encor bien grande pour la dépenſe, puiſque l'efprit de fel vaut 18 liv la pinte, au lieu que l'eau forte ne coûte tout au plus que 2 liv, et que la quantité eft la même pour l'effet. J'ai employé auffi avec beaucoup de fuccès l'efprit de nitre. *Anthropotomie*, pag. 83. 84.

378 ANATOMICAL PREPARATIONS

The substance employed for the injection ought to be entirely melted over a moderate fire, and be heated to the exact degree that will not permit the cooling of it too fast, upon coming into contact with the parts into which it is impelled, nor ought it to be so great, on the other hand, as to burn or crisp the vessels, or prove troublesome to the operator in handling the syringe or pipes, whilst he is making the injection.

The injection should be thrown into the part to be prepared, at one uniform impulse, made slowly and evenly, with a steady hand, and with so little force as not to endanger a rupture of the vessels in the soft parts. When the injection is finished, the pipes should be corked or otherwise closed, and the parts injected should be suffered to cool by degrees. If they are plunged at once into cold water, before the substance of them has acquired a certain degree of hardness and firmness, a contraction in the elastic coats of the vessels may be produced, sufficient to occasion a rupture, especially in the capillaries, which will always be followed by an extravasation of the injected substance.

Having exposed the injected parts to the air during an hour or two, it is proper to commit them to cold water all night, to cool and to harden them thoroughly. After taking them out of the containing vessel and absorbing the water from their surface with a sponge gently applied, or suffering it to run off by draining, they should be put into a sufficient quantity of the menstruum to cover the preparation entirely.

The next consideration is how to make use of the menstruum for corroding the parts to be dissolved and removed from the vessels. For this purpose the operator should be furnished with a china bowl or a stone vessel, on which the menstruum can make no impression; or what will answer still better, a glass vessel with a mouth sufficiently large to put in and take out the injected parts, without any difficulty.

difficulty. It would be well to furnish it with a proper cover to restrain the acid fumes from escaping. I have always used a cover of cork lined with wax, into which, whilst it is in a melted state, the inferior side of the cover may be dipped; and this cover must be cut so as to fit exactly the mouth of the vessel. The great advantage of a glass vessel over the others is its transparency, whereby we are able to see how the corrosion goes on, and to judge when it is finished. This takes up from six or seven days to a fortnight or three weeks, according to the nature of the part to be prepared, and to the quantity and concentration of the menstruum employed, in which it ought to be entirely covered. When the acid is very dilute, it proves rather antiseptic and a preserver of animal substances, than a corrosive menstruum.

Of disengaging the Corroded Substance.

Fifthly. The last part of the operation consists in disengaging the loosened and corroded substance from that of the injection. In this piece of business we ought to take the greatest care, if we wish to avoid breaking down the beautiful small vessels of the part. With this view the acid spirit employed as a menstruum should be decanted from the injection with great caution, whenever the corrosion of the surrounding substance is complete, so that it no longer adheres to the vessels. In place of the corroding menstruum, soak the preparation in simple water for three or four days. The loose substance may be removed from the vessels, by pouring fresh water over the preparation slowly, and in small quantity at a time; or otherwise we may put the preparation in a vessel pierced with holes, like a cullender, and place this in such a manner as to receive a gentle current or stream of water. If we should place the vessel near the nosel of a pump, and under the droppings or smallest stream which we can procure to fall from it, the preparation may be thus cleansed from the loose corroded matter with which it is encompassed.

But

380 ANATOMICAL PREPARATIONS

But the method I have discovered, and always practised as the safest and best, is to make use of a small syringe, the piston whereof works easily, with which, whilst the preparation is covered three or four inches over with water, I syringe gently, so as to wash and clean it entirely from the corroded substance which is but loosely attached to it. In this manner, using proper care, it may be performed perfectly without breaking down any, even the finest parts, of the tender vessels.

But if more force than needful is employed, even the droppings of a pump from a too great height, when the preparation is taken out of the water, will sometimes break down the extremities of the small vessels, and mar the beauty of it.

After all these directions have been well executed, the preparation is to be suspended for some time in a safe place, till it is dry; then it is to be fixed on a wooden pedestal, having a socket like a candlestick, in which it may be fastened with a little glue or melted wax. Then let it be covered with a transparent glass in form of a globe or bell, with the mouth downward, to guard it from accidents. This finishes the work.

These preparations give us a most exact knowledge of all the ramifications and anastomoses of the vessels, and often of the junction of the arterial and venal system, when the injection is fine enough, and so successfully thrown from the arterial trunk as to penetrate into the veins and fill that system of vessels in the organ prepared, completely, at one and the same time. Thus I have filled both the emulgent arterial and venal system of vessels, in a kidney, at one coup de main, through a single pipe fixed in the great trunk of the emulgent artery, the corresponding trunk of the vein being shut up with a ligature. But it is more common for the injection made by the artery to stop at the extremities of the evanescent branches, and to fill the venal system by a second injection, drove through the great trunk of the emulgent vein.

Upon

Upon the whole, these teach us, in the best manner possible, the true and intimate structure of the viscera in general, and of every particular part; from whence we may assert, without fear of any just censure, that preparations thus executed are exceedingly useful, and enrich the cabinet with choice and beautiful specimens of anatomy.

I have only to add that, in order to enable the artist to succeed and push his discoveries, it behoves him to learn the art of preparing the subject by dissection. This is a new branch, though intimately connected with the foregoing: There are few books that teach it; but one very excellent treatise on the subject is published in French by Mons. Süe, already quoted by the title of anthropotomy, or the art of dissecting, injecting, embalming and preserving the parts of the human body; which, as I think it will greatly contribute to improve anatomy, I have some thoughts, at my leisure, to translate into English, for the benefit of the students of anatomy, physic and surgery in America.

I here subjoin the manner of making Wax Preparations by Mons. Süe.

“**W**HEN we have a mind to make any preparation of wax, we ought to begin by moulding the part we wish to imitate with fresh plaister of Paris made very fine, taking care to oil it previous to the application of the plaister.

“When the plaister laid on the surface of the part is cold, remove all the pieces that compose the mould one after another, taking care not to break any of them.

C c c

After

MANIERE DE FAIRE LES PREPARATIONS EN CIRE.

LORSQU'ON veut faire quelque preparation en cire, il faut commencer par mouler la partie que l'on veut imiter avec du plâtre frais et bien fin, ayant l'attention de bien huiler la partie avant que d'appliquer le plâtre. Lorsque le plâtre sera refroidi de dessus la partie, alors on otera toutes les pieces qui composent le moule, l'une après l'autre, prenant garde qu'aucune

After leaving them to dry for some time, they may be safely used. For this purpose, melt a sufficient quantity of virgin wax in a skillet, over a gentle fire, and colour it according to the colour of the part which is to be imitated, with carmine, or other paint; or if the piece to be imitated has several parts of different colours, we must not then colour the whole piece at once, but are to place the colour required upon each part, after the piece has been melted.

“ Whilst the wax melts, prepare the mould, which we must be careful to oil well with a little brush to prevent sticking; then join all the pieces of the mould together, which must be tied fast with small cords or twine; and that the air may not pass through the cracks or joinings of the pieces of the mould, place some clay on the outside, by way of luting.

“ The mould being thus prepared, and having taken care to leave an opening, we pour the wax into the mould through it, and then carefully turn the mould every way, in order that the wax may spread equally through all the interior parts, of it until it is cold. If it be found that the piece is not thick enough, we are to pour on more melted wax, and turn it as before; then let the piece cool in the mould: afterwards, with proper precaution, we are to take the pieces of the mould apart, one after the other. The preparation being taken out of the mould entire, we must take off the superfluous portions of wax which penetrated the

qu'aucune ne casse. On le laisse secher pendant quelque tems. Ensuite on peut s'en servir. Pour cet effet on fait fondre de la cire vierge dans un poulon à petit feu, et on le colore, suivant la couleur de la partie qu'on veut représenter, avec du carmin, ou quelque autre couleur; ou bien, si la partie a plusieurs parties de couleur differente, alors on ne colore point la piece. Et on met la couleur sur chaque partie après que la piece a ete fondue. Pendant que la cire fonde on prepare le moule, qu'on a le soin de bien huiler avec un pinceau. Ensuite on ressemble toutes les pieces du moule, qu'on retient unies avec des cordes ou de la ficelle, et pour que la cire ne passe par les fentes ou les jointures des pieces du moule, on y met sur les jointures exterieurement, de la terre glaisse. Le moule prepare ainsi, et ayant eu l'attention de y laisser une ouverture, on verse la cire dans le moule, et l'on a le soin de tourner le moule en tout sens, pour que la cire se repande egalemant par tout l'interieur du moule, jusques a ce qu'elle soit rafroidie. Si vous jugez que la piece ne soit pas assez epaisse, vous remettez de nouveau de la cire, et vous faites comme ci dessus. Après quoi on laisse rafroidir la piece dans le moule, et ensuite on tire avec beaucoup de precaution les pieces du moule, l'une après l'autre. La piece etant entierement depouillee, on la repare. C'est à dire qu'on ote de dessus

the joinings of the pieces of the mould, which being entirely repaired, we then colour the different parts which compose the piece with colours suitable to each part, that the arteries may be coloured with vermillion; the veins with Prussian blue; the muscles with carmine; and so of the other parts; *which finishes the preparation.*

“ *Note*, When we wish to make the wax less brittle, we must add some spermaceti to it; and sometimes a little of the finest Venice turpentine that can be procured.”

Les portions excédentes de cire qui se sont glissées entre les jointures des pièces du moule. La pièce étant entièrement réparée, on colore les différentes parties qui composent la pièce avec des couleurs convenables à chaque partie, en sorte que les artères seront colorées avec du vermillon; et les veines avec du bleu de Prusse; les muscles avec du carmin; ainsi des autres.

Nota que quand on veut rendre la cire moins cassante on y adjoute le blanc de baleine, quelque fois aussi un peu de terebentine de Venise, tout ce qu'il y a de plus fin.

N° XLIII.

Of a living Snake in a living Horse's Eye, and of other unusual Productions of Animals. By JOHN MORGAN, M. D. F. R. S. London, Professor of the Theory and Practice of Physic, Philadelphia.

Read June
5, 1782.

WHETHER there is such a thing in nature as equivocal generation, by which is to be understood the production of any new animal independent of a parent stock of the same kind, has been a subject of controversy amongst philosophers; some asserting the reality of this doctrine, whilst others, as the celebrated Harvey and his followers as strenuously reject it. The latter, which is now deemed the orthodox side of the question, affirm that the young of all are produced from an egg, furnished by the female, and fecundated by a male animal. From the light thrown upon this subject, by the deep researches of Hippocrates, Galen and Aristotle,